Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended)   An In-Circuit Emulation system breakpoint control, comprising:

a microcontroller;

a virtual microcontroller, which is not identical to and emulates operation of the microcontroller, configured to operate ~~operating~~ in lock-step synchronization with the microcontroller by executing same instructions using same clocking signals ~~by virtue of their identical operation~~;

a breakpoint lookup table, wherein said breakpoint lookup table comprises a plurality of break bits associated with a sequence of instruction addresses, and wherein said sequence of instruction addresses are associated with the virtual microcontroller, and wherein each of said sequence addresses has a corresponding break bit, the break bit being set to indicate that a break is to occur at a specified address; and

a breakpoint controller that sends a break message to the microcontroller whenever an instruction address is encountered that is associated with a set break bit.

2. (Original)   The apparatus according to Claim 1, wherein the break message is sent to the microcontroller over an interface linking the microcontroller with the virtual microcontroller.

3. (Original) The apparatus according to Claim 1, further comprising a program counter that increments through the breakpoint lookup table as a sequence of instructions is executed.

4. (Original) The apparatus according to Claim 1, further comprising a host computer that programs the breakpoint lookup table to set a breakpoint bit at an instruction address where a break is to occur.

5. (Original) The apparatus according to Claim 1, wherein the microcontroller and the virtual microcontroller operate in a two phase cycle comprising a control phase and a data transfer phase.

6. (Original) The apparatus according to Claim 5, wherein the break message is sent during the control phase.

7. (Currently Amended)   A method of establishing a breakpoint in a microcontroller in an In-Circuit Emulation system, comprising:

storing a breakpoint lookup table in a virtual controller, which is not identical to and emulates operation of the microcontroller, wherein said breakpoint lookup table comprises a plurality of break bits associated with a sequence of instructions, wherein each of said sequence of instructions has a corresponding break bit;

executing said sequence of instructions in a the microcontroller and in the virtual microcontroller in lock-step synchronization by using same clocking signals by virtue of their identical operation;

at each instruction of the sequence of instructions, inspecting the breakpoint lookup table for a set break bit associated with instruction; and

if a break bit is set, sending a break message to the microcontroller to implement a break in instruction execution.

8. (Original) The method according to Claim 7, wherein the lookup table comprises a memory having a break bit associated with each instruction address.

9. (Original) The method according to Claim 7, further comprising programming the lookup table from a host computer.

10. (Original) The method according to Claim 7, further comprising incrementing a program counter through the breakpoint lookup table as a sequence of instructions is executed.

11. (Original) The method according to Claim 7, further comprising halting execution of instructions in the microcontroller and the virtual microcontroller prior to the instruction associated with the set break bit.

12. (Original) The method according to Claim 7, wherein the microcontroller and the virtual microcontroller operate in a two phase cycle comprising a control phase and a data transfer phase.

13. (Original) The method according to Claim 12, wherein the break message is sent during the control phase.

14. (Currently Amended)   A method of establishing a breakpoint in an In-Circuit Emulation system, comprising:

executing a sequence of instructions in a microcontroller and in a virtual microcontroller, which is not identical to and emulates operation of the microcontroller, ~~executing a sequence of instructions~~ in lock-step synchronization by using same clocking signals ~~, by virtue of their identical operation~~, the virtual microcontroller having a breakpoint lookup table, wherein said breakpoint lookup table comprises a plurality of break bits associated with said sequence of instructions, and wherein each of said sequence of instructions has a corresponding break bit;

determining an instruction address which a break is to precede;

programming the breakpoint lookup table to have a set break bit at the instruction address ~~with a~~ which the break is to precede;

at each instruction of the sequence of instructions, inspecting the breakpoint lookup table for a set break bit associated with instruction; and

halting execution of instructions in the microcontroller and the virtual microcontroller prior to the instruction associated with the set break bit.

15-16. (Canceled)

17. (Previously Presented) The method according to Claim 14, wherein if a break bit is set, sending a break message to the microcontroller to implement a break in instruction execution.

18. (Original) The method according to Claim 14, wherein the lookup table comprises a memory having a break bit associated with each instruction address.

19. (Original) The method according to Claim 14, wherein the programming of the lookup table is carried out from a host computer.

20. (Original) The method according to Claim 14, wherein the microcontroller and the virtual microcontroller operate in a two phase cycle comprising a control phase and a data transfer phase, and wherein the break message is sent during the control phase.

21. (Currently Amended) The apparatus according to Claim 1, wherein said virtual microcontroller emulates ~~functions identical to~~ said microcontroller such that the content of said microcontroller can be accessed to reduce debugging related functions on said microcontroller.

22. (Currently Amended) The method according to Claim 7, wherein said virtual microcontroller emulates ~~functions identical to~~ said microcontroller such that the content of said microcontroller can be accessed to reduce debugging related functions on said microcontroller.

23. (Currently Amended) The method according to Claim 14, wherein said virtual microcontroller emulates ~~functions identical to~~ said microcontroller such that the content of said microcontroller can be accessed to reduce debugging related functions on said microcontroller.